Interplay of factors involving chlorine dose, turbidity flow capacity and pH on microbial quality of drinking water in small water treatment plants

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Abstract

In an endeavour to ascertain the interplay of factors involving chlorine dose, turbidity and flow capacity on microbial quality of drinking water in small water treatment plants (SWTPs), data from a previous study were analysed.

The findings showed that most of the SWTPs were not producing water of safe microbial quality. Fifty one percent (51%) and seventy three (73%) of the SWTPs were below the stipulated limits for residual chlorine in final water and water at the point of use respectively. Current flow capacity was a major determinant of the microbial water quality indicators but no association was found between the dose of chlorine used for water treatment and the microbial water quality indicators. However, a combination of the amount of chlorine dose used up during treatment, flow capacity and change in turbidity contributed to about 65% of the amount of heterotrophic plate counts removed from raw water. Current flow capacity contributed less than 14% of the variation in chlorine dose used in water treatment at the plants. Turbidity tended to correlate and contribute more to the prediction of total coliform counts while faecal coliform counts were determined by current flow capacity and conductivity. Treatment plants with current flow capacity of over 50 Mℓ/d tended to be more efficient in heterotrophic plate count removal.

In conclusion, this study noted that most of the SWTPs were using a chlorine dosage that was below the amount required by their respective current flow capacity; possible micro-organism resistance to chlorine and the significant effect of the level of turbidity on the microbial quality of treated water.

Keywords: microbial indicators, chlorine dose, current flow capacity, turbidity, water treatment plants